LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

MILL CREEK RESERVOIR

WATERBODY EVALUATION &
RECOMMENDATIONS

CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED ANNUALLY

August 2014 -- Prepared by:

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WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational
Sport fish species, other than bass, are managed to provide sustainable populations while providing anglers the opportunity to catch or harvest numbers of fish adequate to maintain angler interest and efforts. Bass anglers are afforded the opportunity to catch quality-size largemouth bass through the introduction of Florida largemouth bass.

Commercial
Commercial harvest is allowed; however, there is no indication of an active commercial fishery.

Species of Special Concern
No threatened or endangered fish species are found in this lake.

EXISTING HARVEST REGULATIONS

Recreational
Statewide regulations for all fish species, the 2014 recreational fishing regulations may be viewed at the link below:
http://www.wlf.louisiana.gov/fishing/regulations

Commercial
The 2014 commercial fishing regulations may be viewed at the link below:
http://www.wlf.louisiana.gov/fishing/regulations

Species of Special Concern
No threatened or endangered fish species are found in this waterbody.

SPECIES EVALUATION

Recreational
Largemouth bass (*Micropterus salmoides*) and crappie (*Pomoxis* spp.) are targeted in standardized sampling in Mill Creek Reservoir as species of interest due to their popularity with recreational anglers and their high positions in the food chain. In years past, bass and other fish species were sampled using rotenone to derive biomass estimates. Biomass (rotenone) sampling was used extensively in Mill Creek from 1981 until 1986. Biomass sampling is an excellent method for determining standing crop for all fish species, predator-prey ratios and relative sizes of various fish species. However, recent increases in lakeshore residents and changes in public attitudes have made the use of fish toxicants controversial. Consequently, biomass sampling has been replaced by electrofishing, netting and other non-lethal sampling methods. Of the sampling methods presently used, electrofishing is the best indicator of largemouth bass abundance and size distribution, with the exception of larger

sized bass. Gill net sampling is used to determine the status of large bass and other large fish species. Shoreline seining and fall electrofishing are used to collect information related to bass reproduction and forage species. Lead net sampling is used to monitor the status of crappie populations.

Largemouth Bass

Standing crop estimates

Data presented in Figure 1 indicate the standing crop of largemouth bass in pounds per acre during rotenone sampling from 1981 to 1986. The standing crop in 1985 measuring 19.89 pounds per acre was the highest measured in Mill Creek; however, significantly lower measurements of 2.99 and 2.77 pounds per acres were measured in 1981 and 1986, respectively.

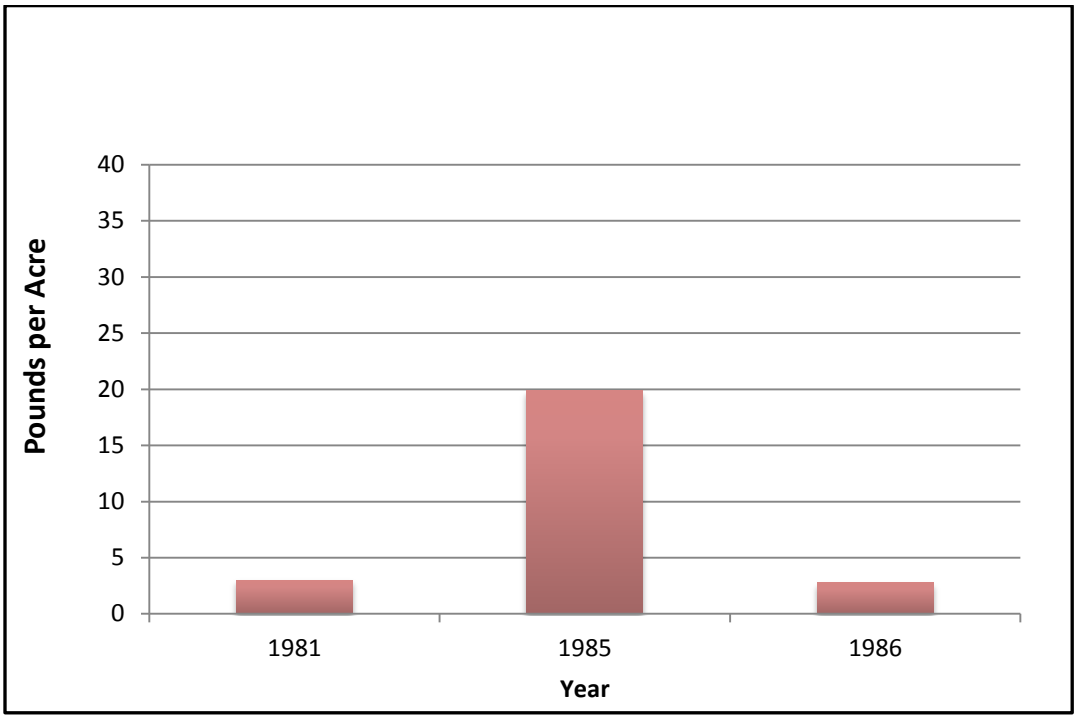

Figure 1. Average standing crop estimates (pounds per acre) for largemouth bass collected from biomass (rotenone) sampling in Mill Creek Reservoir, LA from 1981 to 1986.

Catch per unit effort, structural indices and size distribution

Electrofishing has been the primary sampling technique utilized on Mill Creek Lake since 1996. Electrofishing is the best indicator of largemouth bass relative abundance and size distribution, with the exception of large fish (> 5 lbs.). Sampling with gill nets provides better assessment of large bass and other large-bodied fish species.

Figure 2 below illustrates fall electrofishing data collected since 1996. Numbers of quality (≥12") and preferred (≥15") fish are relatively low with the two groups averaging 4.2 and 1.9 fish per hour, respectively. Fall electrofishing is used to evaluate spawning and recruitment for largemouth bass. The data suggest that bass spawns in 2003 and 2005 were poor. However, bass in sub-stock/stock classes increased significantly in 2008. This increase in relative abundance of sub-stock class and recruitment into the stock class was likely triggered by the 2007 fall/winter drawdown.

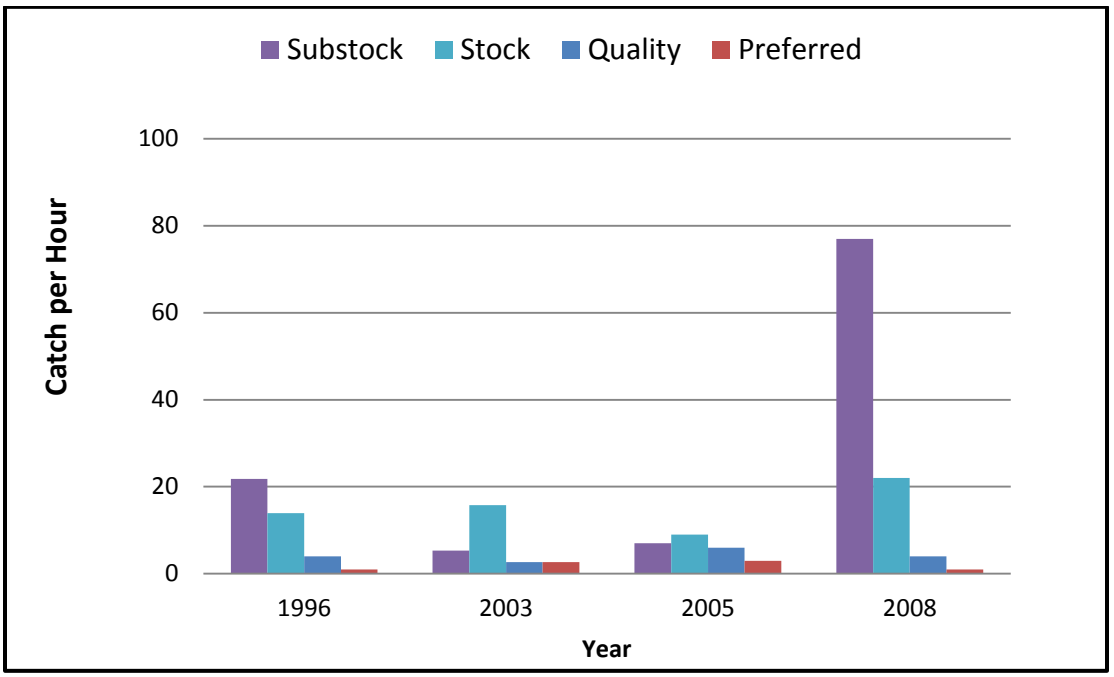

Figure 2. Fall electrofishing catch-per-unit-of-effort (CPUE) for sub-stock-size(<8"), stock-size (≥8"), quality-size(≥12"), and preferred(≥15") largemouth bass in Mill Creek Lake, LA, from 1996, 2003, 2005, and 2008.

Proportional stock density (PSD) and relative stock density (RSD) are indices used to numerically describe size distribution (length) data. Proportional stock density compares the number of fish of quality-size (≥12 inches total length (TL) for largemouth bass) to the number of bass of stock-size (≥ 8 inches in total length TL). The PSD is expressed as a percentage. A fish population with a high PSD consists mainly of larger individuals, whereas a population with a low PSD consists mainly of smaller fish. Relative stock density compares the number of fish of a given size range to the number of bass of stock size. A common calculation used in fisheries management is for RSD-Preferred or RSD-P. This value compares the number of largemouth bass ≥ 15 inches TL to the number of stock-size largemouth bass in the population. This is also commonly called RSD-15 values. Values for PSD and RSD – Preferred (≥ 15 inches in TL), are shown in Figure 3 below. Normal PSD and RSD-P values for largemouth bass range from 40-70 and 10-40, respectively.

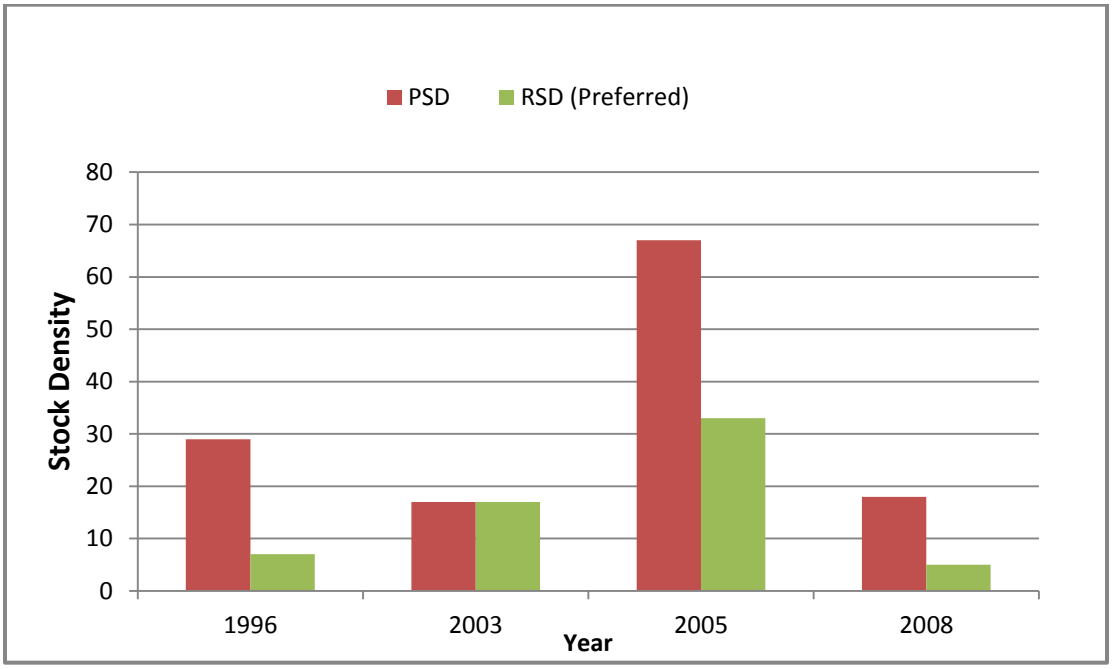

Figure 3. Largemouth bass size-structure indices for fish collected during spring electrofishing on Mill Creek Reservoir, LA, from 1996 to 2008.

PSD and RSD-P values on Mill Creek Reservoir are typically low. The higher values indicated for 2003 and 2005 are be an aberration caused by low sample size. Only one additional "preferred" fish was caught in those years in comparison to 1996 and 2008.

Figure 4 illustrates the CPUE and size distribution of largemouth bass from the fall 1996 electrofishing sample along with the Wr for stock-size fish collected during this sample. The total CPUE is very low, and average relative weights for stock-size fish fall below 90%. These low relative weights indicate that available forage was limited. Mill Creek Reservoir is an infertile waterbody. Water transparency is typically high. Measurements by the use of a Secchi disc often exceed 2.5 meters. Phytoplankton density and resulting primary productivity are low.

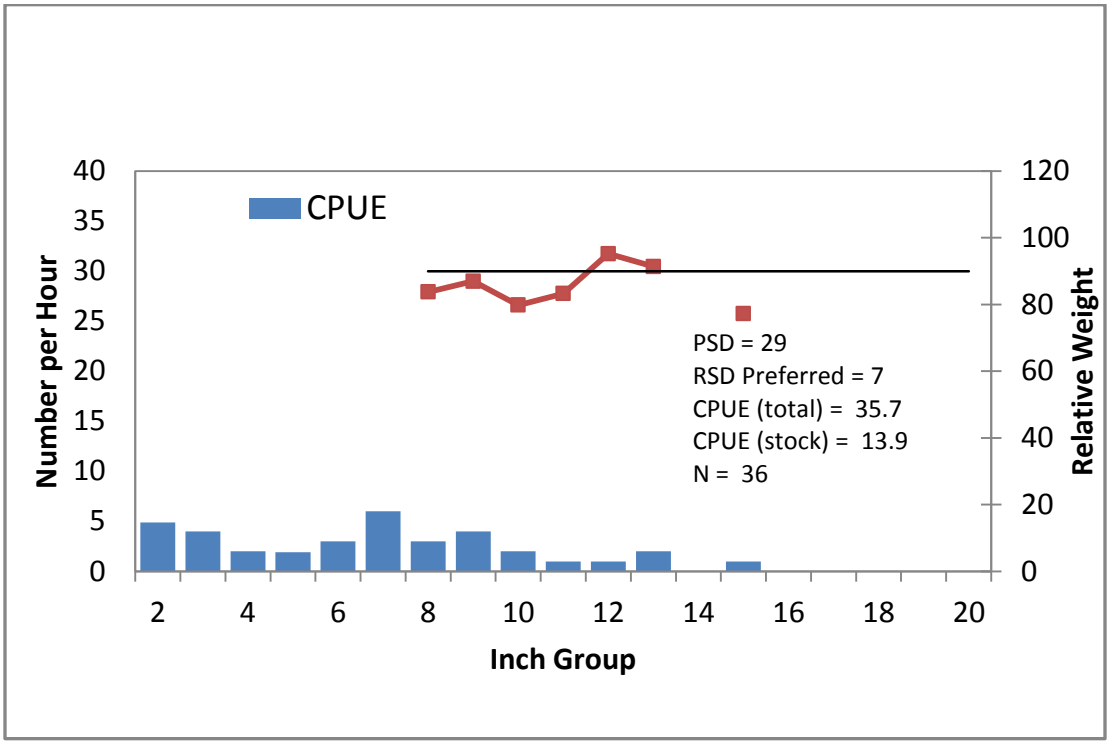

Figure 4. The CPUE, size distribution and relative weights of largemouth bass from fall 1996 electrofishing samples on Mill Creek Lake, LA.

Figure 5 displays largemouth bass sampling CPUE from fall electrofishing in 2008. It is interesting to note that this sampling effort followed the 7-foot drawdown in which the gates opened on 9/24/2007 and closed on 1/15/2008. The data indicate a successful largemouth bass spawn with a high CPUE of sub-stock fishes. Some recruitment into the stock-size fish class is occurring in comparison to the 1996 fall samples; however, the quality-size fish classes appear very similar to the 1996 fall samples. Relative weights of stock-size fish indicate adequate forage availability. The increased forage was likely a result of increased nutrients returning to the lake after the 2007 fall/winter drawdown and increased spawning activity by forage species.

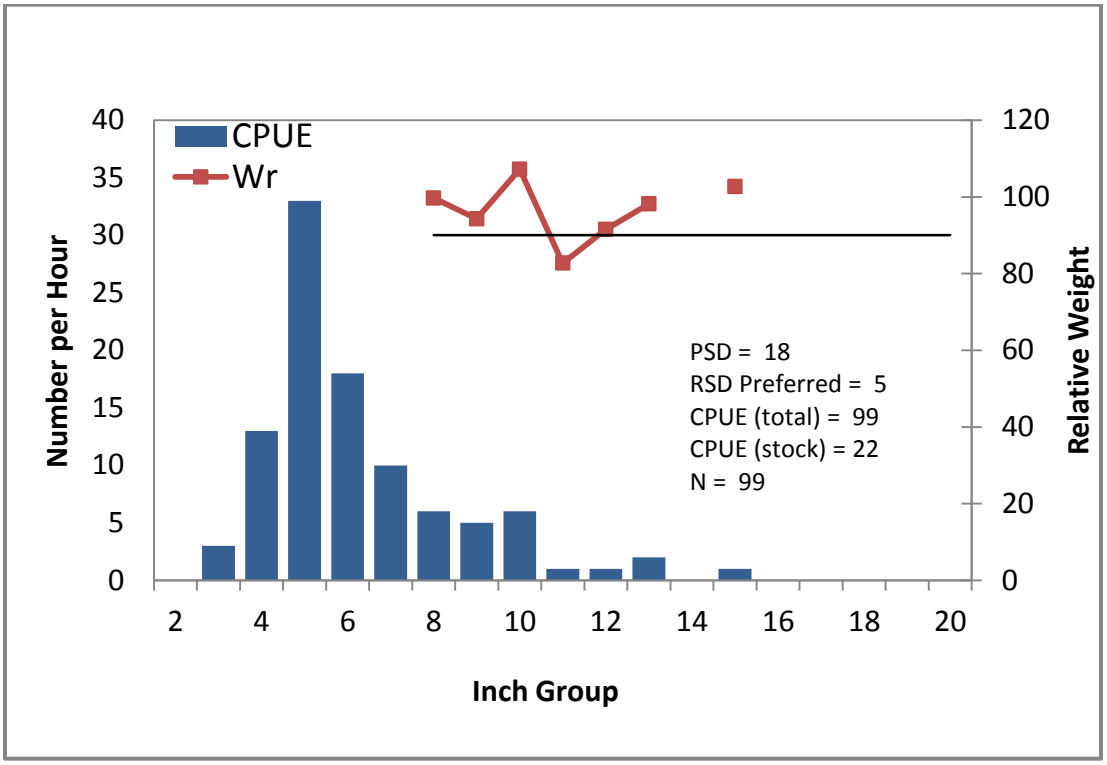

Figure 5. The CPUE, size distribution and relative weights of largemouth bass from fall 2008 electrofishing samples on Mill Creek Reservoir, LA.

Forage

Bluegill (*Lepomis macrochirus*), redear sunfish (*L. microlophus*), longear sunfish (*L. megalotis*), warmouth (*L. gulosus*), and brook silversides (*Labidesthes* sicculus) provide the primary forage base for the largemouth bass population. Gizzard shad (*Dorosoma cepedianum*) are abundant in Mill Creek. Benthic invertebrates such as insect larvae, worms and crawfish are also utilized by predatory fish species. The chart in Figure 6 below gives a summary of fish ≤ 5" which are available as forage collected during rotenone sampling from 1981 to 1986 on Mill Creek Reservoir.

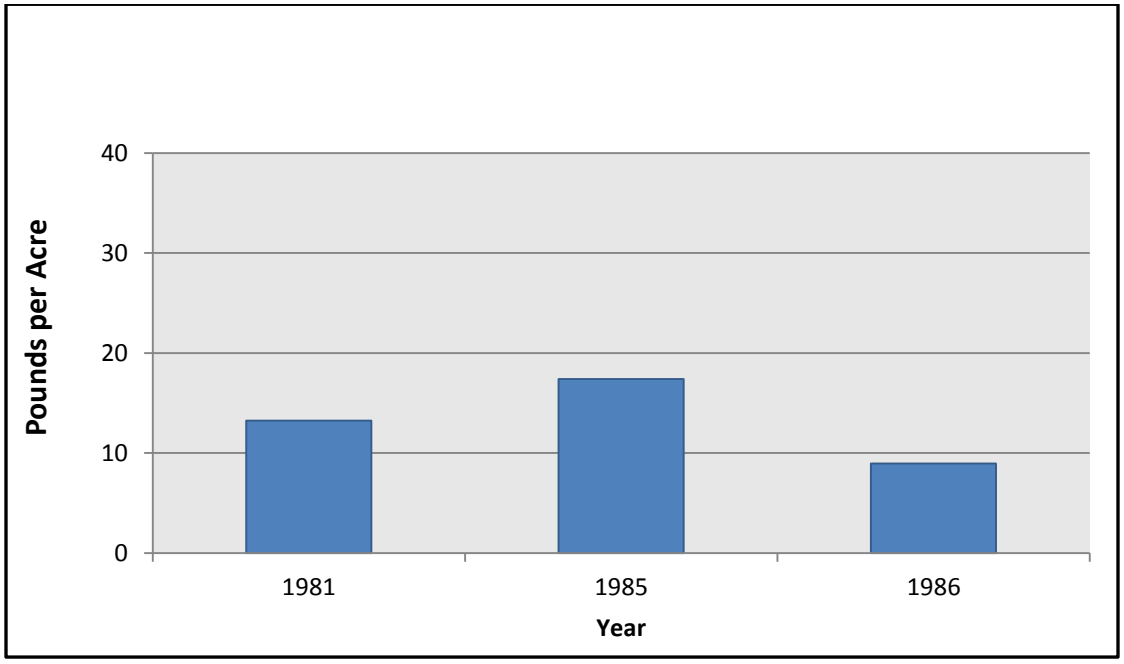

Figure 6. Pounds per acre of forage size fish ≤ 5" which were collected during biomass (rotenone) sampling on Mill Creek Reservoir, LA from 1981, 86, and 86.

Biomass sampling with the use of fish toxicants has been discontinued and forage is now sampled by shoreline seining, electrofishing and indirectly by the measurement of largemouth bass relative weight (Wr). Relative weight (Wr) is the ratio of a fish's weight to the weight of a "standard" fish of the same length. The index is calculated by dividing the weight of a fish by the standard weight for its length, and multiplying the quotient by 100. Relative weights for largemouth bass in Mill Creek Reservoir have varied over time as illustrated in Figures 4 and 5 above. It is likely that the sampling conducted in 1996 is the best representation available for a "typical" year on Mill Creek Reservoir. The 2008 samples followed a drawdown the previous year. The 1996 samples indicate that forage may be limited as relative weights for both stock size and preferred size bass were below 90. Additionally, the quality size bass only had an average Wr of 92.65, which falls below the relative weights observed on other area lakes. Little can be inferred from the 2003 or 2005 data due to low sample sizes. Largemouth bass Wr values below 90 indicate a shortage of available forage. Relative weights from fish measured during the fall of the year are more indicative of the available forage in the lake than relative weights obtained in the spring. The chart in Figure 7 below provides Wr values for largemouth bass of different size groups captured in fall of 1996, 2003, 2005, and 2008 electrofishing samples.

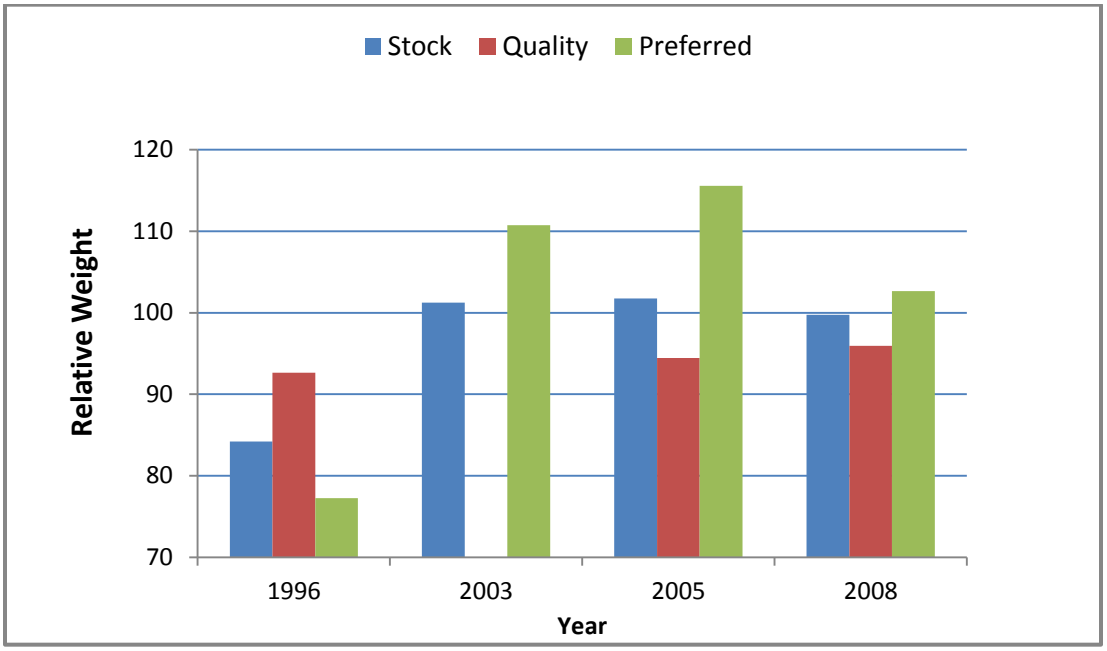

Figure 7. Relative weights for stock- (8" – 12"), quality- (12" – 15"), and preferred-size (15" – 20") largemouth bass collected during fall electrofishing sampling on Mill Creek Reservoir, LA in 1996, 2003, 2005, and 2008.

An electrofishing forage sample was conducted during the fall of 2008. The results of this sample are presented in Figures 8 and 9 below. The primary forage species 5" TL and less are included in the graph below. The results indicate that sunfish (*Lepomis* spp.) are the primary forage base found in Mill Creek Reservoir.

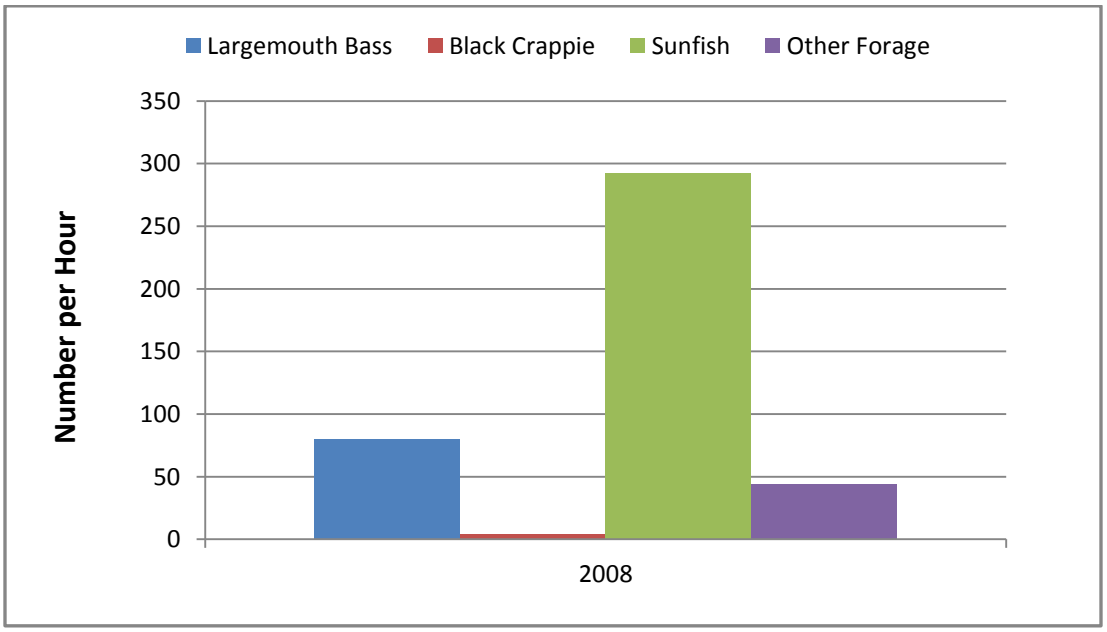

Figure 8. Catch per unit effort for fish ≤ 5" TL collected during fall electrofishing forage sample from Mill Creek Reservoir, LA 2008.

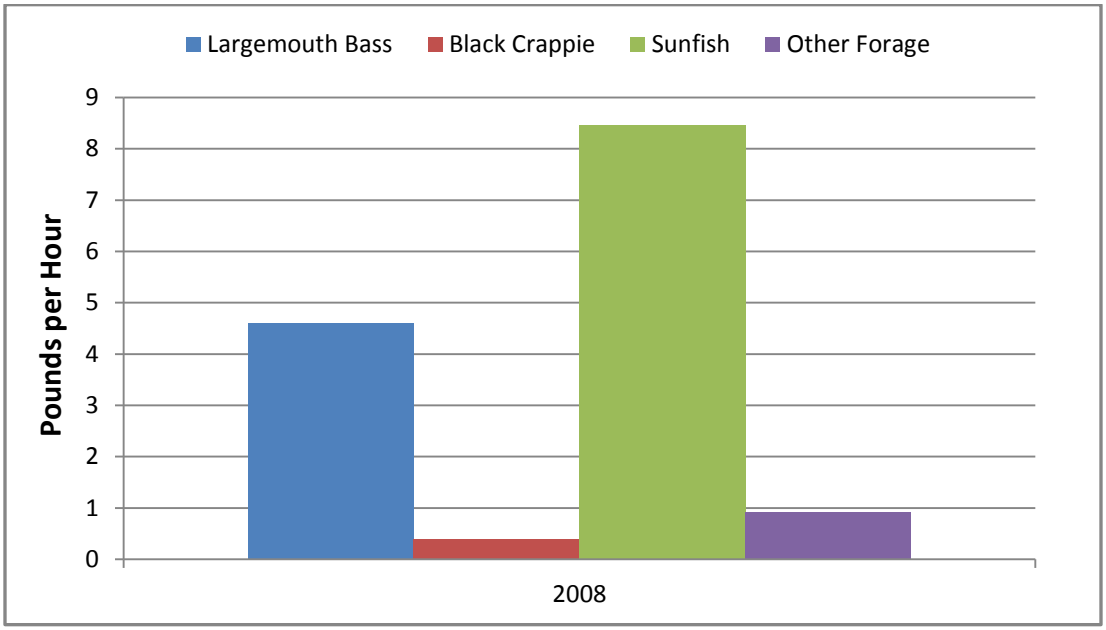

Figure 9. Pounds per hour for fish ≤ 5" TL collected during fall, electrofishing forage sample from Mill Creek Reservoir, LA 2008.

Genetics

Florida largemouth bass (FLMB) have been stocked into Mill Creek Reservoir in an attempt to increase the genetic potential for production of large bass. FLMB have been stocked in Mill Creek Reservoir seven times since 2003. Most stockings averaged 9 fish/acre; however, more than 30 FLMB/acre (17,260 fish) were stocked in 2009. All stocked fingerlings have averaged ≤ 1" TL. Table 1 displays the genetic analysis of bass from Mill Creek Reservoir. Genetic analysis was conducted in 1999 with a return of 6% Florida and 13% hybrid largemouth bass. The presence of the Florida gene before the initial LDWF stocking 2003 is unexplained. In 2005 and 2008, samples determined to be Florida bass comprised 5 and 0% respectively. Hybrid northern x Florida bass comprised 26 and 9%. The low sample size is a concern with regard to accuracy. Results may not be indicative of the existing LMB population.

Table 1. – Largemouth Bass Genetic Analysis from Mill Creek Reservoir, LA for 1999-2008.

Year	Number	Northern %	Florida %	Hybrid %
1999	16	81	6	13
2005	18	68	5	26
2008	35	91	0	9

Crappie

Crappies are popular with recreational anglers in Mill Creek Reservoir. The graph below illustrates pounds of crappie per acre collected during rotenone sampling in 1981, 1985, and 1986. To date, the standard sampling techniques for crappie have provided very limited data on the size distribution and abundance of crappie in Mill Creek Reservoir. Few black crappies (*Pomoxis nigromaculatus*) have been captured. Lead net sampling has now become the standard LDWF sampling gear for crappie. Lead net sampling is scheduled for 2015.

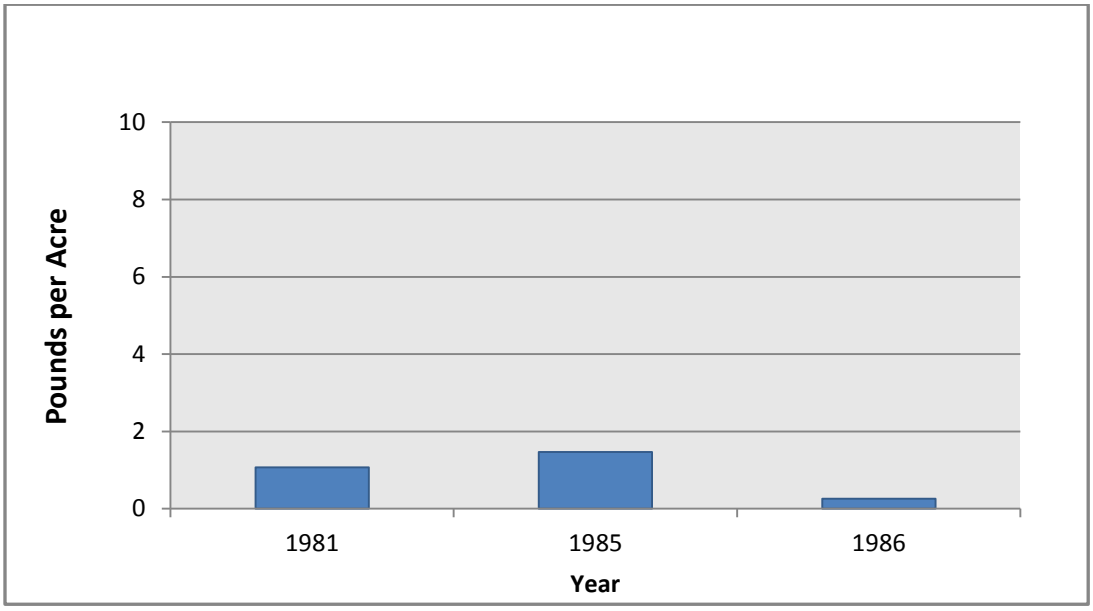

Figure 10. Standing crop estimates in pounds per acre of black crappie from Mill Creek Reservoir, LA biomass sampling conducted from 1969 – 1991.

Commercial

No commercial fishery exists on Mill Creek Reservoir. Figures 11 and 12 indicate pounds and number per net night, respectively, of fish captured in standardized gill net sampling.

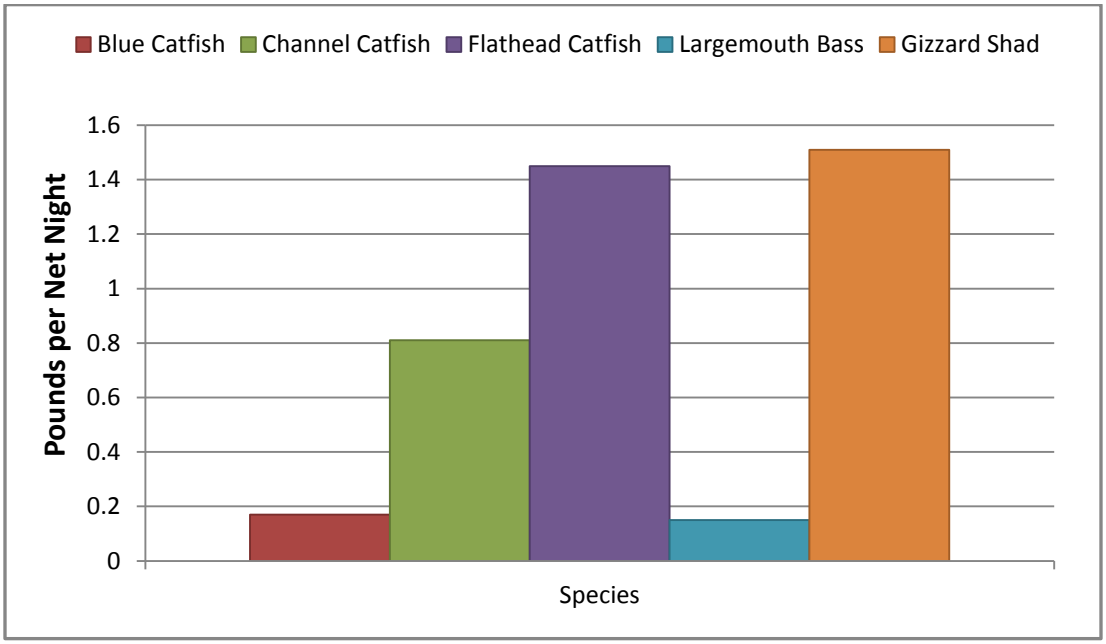

Figure 11. The mean CPUE (pounds of fish) for blue catfish, channel catfish, flathead catfish, largemouth bass, and gizzard shad captured in gill nets from Mill Creek Reservoir, LA, for 2010.

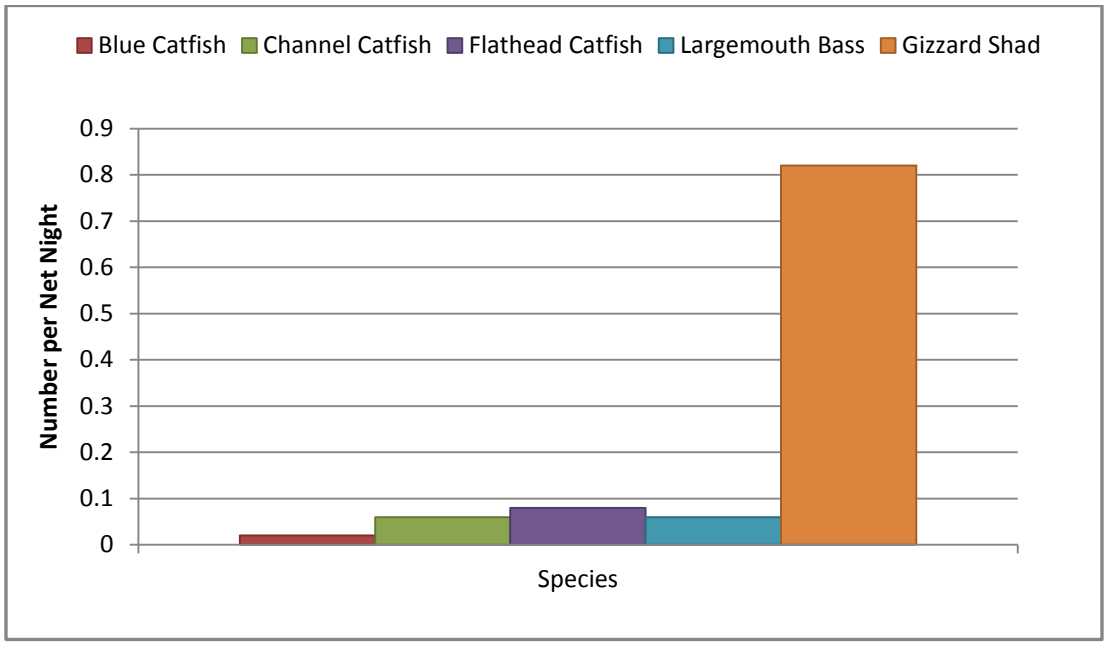

Figure 12. The mean CPUE (number of fish) for blue catfish, channel catfish, flathead catfish, largemouth bass, and gizzard shad captured in gill nets from Mill Creek Reservoir, LA, for 2010.

Species of Special Concern

No threatened or endangered species are known to occur in Mill Creek Reservoir.

HABITAT EVALUATION

Aquatic Vegetation

Mill Creek Reservoir has had some issues with submerged aquatic vegetation (SAV) in the shallow areas of the lake since impoundment. The primary species of SAV in Mill Creek Reservoir have been bladderwort (*Utricularia* sp.) and fanwort (*Cabomba caroliniana*). Southern naiad (*Najas guadalupensis*), spike rush (*Eleocharis* sp.), muskgrass (*Chara* sp.), coontail (*Ceratophyllum demersum*), filamentous algae, southern watergrass (*Luziola fluitans*), milfoil (*Myriophyllum* sp.), and widgeon grass (*Ruppia maritima*) are other species of submerged aquatic vegetation that have been known to occur in Mill Creek Reservoir. The native submerged vegetation that occurs in the reservoir is generally not found out past the 7 foot contour despite the clear water in Mill Creek Reservoir. The coverage generally does not exceed 25% - 30% and is often much less. Even at low levels of coverage, the submerged aquatic vegetation can be a nuisance for shoreline property.

Emergent aquatic vegetation is generally only found in the shallower areas of the lake out to about the 4 foot contour. The primary species of emergent aquatic vegetation is water shield (*Brasenia schreberi*). This plant will often form a fringe around the lake. Related complaints are received from shoreline residents. Other common emergent species include pondweed (*Potamogeton* sp.), water pennywort (*Hydrocotyle umbellata*), fragrant water lily

(*Nymphaea odorata*), water primrose (*Ludwigia octovalvis*) and alligator-weed (*Alternanthera philoxeroides*).

Floating vegetation has not been problematic in Mill Creek Reservoir. Duckweed (*Lemna* sp.) is present and giant salvinia (*Salvinia molesta*) was discovered in 2013. Giant salvinia plants were found only in one small area in the upper end of the lake. The LDWF response included a foliar herbicide application and a follow-up application. In June 2014, an application was made to giant salvinia in the same location (0.2 acres).

In 2014, aquatic vegetation coverage on Mill Creek remained similar to recent years. Light coverage of native submersed vegetation, consisting primarily of bladderwort and fanwort, was growing out to approximately the 7 foot contour (approximately 10% of the lake). Emergent vegetation included watershield, water primrose, cattails, cutgrass and water pennywort. Watershield and water primrose were the most common species on the lake, but was isolated to a fringe along the shore in the upper end of the lake and coves. This vegetation is only problematic along the inhabited shoreline areas near piers.

Mill Creek Reservoir is scheduled for a seven-foot drawdown in September 2014. This should aid in the reduction of submerged aquatic vegetation and giant salvinia on the lake.

Substrate

The substrate of Mill Creek Reservoir is composed of relatively infertile sandy and light clay soils. Organic content is generally high in the upper end of the lake due to the long term overabundance of aquatic vegetation. Suitable fish spawning substrate is available along the shoreline in the lower end of the lake.

Complex Cover

Complex cover in Mill Creek Lake consists primarily of stumps and aquatic vegetation. The upper half of the lake contains submerged stumps which provide some cover for fish, but are a major navigation hazard as the creek channel is poorly marked.

CONDITION IMBALANCE / PROBLEM

Aquatic vegetation seldom exceeds 25% coverage on Mill Creek Reservoir. Watershield often forms a fringe along the shoreline causing concern from some property owners. Submerged aquatic vegetation can be found growing out to the seven foot contour line. Clear water conditions provide potential for major SAV problems; however, the steep contour of the lake bottom aids in reducing the spread of these plants.

The fish population reflects the low primary productivity of Mill Creek Reservoir. Secchi disk readings in excess of 2.5 meters were recorded during water quality sampling in 2010.

Access to the northern half of the lake is limited by a vast stump field. The channel is poorly marked in this area. Boaters who are unfamiliar with the lake must proceed with caution.

CORRECTIVE ACTION NEEDED

The strategy to maintain 15-30% coverage of aquatic vegetation in Mill Creek Reservoir for sufficient fisheries production requires little effort on the part of LDWF. The steep contours of the lakebed prevent SAV from encroaching further into the lake. Wave action prevents floating aquatic plants from becoming well established. Emergent vegetation creates an access issue for some shoreline owners. Periodic drawdowns every 7-10 years for shoreline maintenance have secondarily provided sufficient relief from aquatic vegetation on Mill Creek.

Fisheries sampling indicates that the sportfish populations in the lake, responded positively to the 2007 drawdown. Drawdowns provide a temporary increase in fertility of a waterbody. Drawdowns every 7-10 years have provided adequate control for submerged aquatic vegetation. However, increasing the frequency of drawdowns should correspond to an increase in the overall fertility of Mill Creek Reservoir and therefore improve the sport fish populations.

The boating channel on the upper half of the lake should be clearly marked. Both sides of the channel should be marked with pilings and Coast Guard approved signage. Any stumps threatening boating safety should be removed or cut well below the waterline. A future drawdown may be necessary to facilitate such a project.

RECOMMENDATIONS

1) Meet annually with the Mill Creek Recreation and Water Conservation District Commission (MCRWCDC). Share this document and all future updates in the Waterbody Management Plan series with the commission.

2) Conduct strategic foliar herbicide applications to giant salvinia as needed. Diquat will be used from November 1 through March 31 at a rate of 0.75 gallons per acre mixed with a total of 1 qt. per acre of surfactant being comprised of 1 part Thoroughbred and 3 parts Aqua King. Outside of that time frame, giant salvinia will be controlled with a mixture of glyphosate (0.75 gal/acre) and diquat (0.25 gal/acre) with Aqua King Plus (0.25 gal/acre) and Thoroughbred (12 oz. /acre) surfactants. Watershield will be controlled with 2,4-D in areas where access is limited to shoreline property on an as-needed basis.

3) Stock Florida largemouth bass fingerlings as per the official LDWF Stocking Policy. Florida largemouth bass should be stocked as available.

4) Continue standardized fisheries sampling to monitor fish populations. Emphasis will be placed upon expanding electrofishing sampling into the western half of the lake. Lead net sampling will be conducted to collect more reliable data to describe the crappie and catfish populations.

5) Work with the MCRWCDC, the Bienville Parish Police Jury, and the Louisiana Department of Transportation and Development to plan and secure funds for a possible future channel/boat lane marking project on Mill Creek. During the 2014 drawdown, LDWF will investigate the existing boating channels on the lake. A GPS will be used to mark the corners and other necessary points along the channel so that a project proposal can be written.

6) To increase productivity in Mill Creek Reservoir, the frequency of drawdowns should be increased. Drawdowns should be conducted every 4 years beginning with the 2014 drawdown. Several factors are unknown at this time to recommend a specific prescription for future drawdowns. LDWF will investigate the lake bed during the 2014 drawdown to determine the timing, rates, and water levels to recommend for future drawdowns to increase productivity. Ideally, these drawdowns could be conducted while still allowing access to the lake at the boat launch. This plan will be presented to the MCRWCDC for their approval prior to implementation.